

**B.Sc. BIOTECHNOLOGY  
SIXTH SEMESTER  
ENVIRONMENTAL BIOTECHNOLOGY  
BBT-603**

**SET  
B**

Duration: 3 hrs.

Full Marks: 70

Time: 30 mins.

Marks: 20

[USE OMR SHEET FOR OBJECTIVE PART]

( Objective )

Choose the correct answer from the following:

1 × 20 = 20

- In IMViC test *i* stands for:
  - Indole test
  - Isomerase test
  - Inole test
  - None of these
- Which is of the following produces yellow compound?
  - 4-methylumbelliferyl β-D-glucuronides
  - O-nitrophenyl β-D-galactopyranoside
  - α-galactosidase
  - All of these
- Conversion of ammonia to nitrate is known as:
  - Natrofication
  - Nitrifraction
  - Nitrofication
  - Nitrification
- Measurement of TOC is required when concentration of organic matter is:
  - High
  - Moderate
  - Low
  - All of these
- Which of the following is the index organism in sewage?
  - Streptococcus faecalis*
  - Clostridium perfringens*
  - Both a & b
  - None of these
- The process of bioremediation includes all but which of the following?
  - Biostimulation
  - Natural attenuation
  - Bioaugmentation
  - Bioaccumulation
- The removal of contaminated groundwater or soil from its natural habitat is an integral part of this cleaning strategy:
  - Phytoremediation
  - in situ* bioremediation
  - ex situ* bioremediation
  - Bioaugmentation
- Choose the metagenomics analysis method that makes use of homology and similarity.
  - RasMol
  - BLAST
  - EMBOSS
  - PROSPECT
- Which of the following is most frequently utilized in xenobiotic biodegradation?
  - Chemicals
  - Physical sorting
  - Degradative Enzymes
  - Degradable PAHs
- The employment of living microorganisms to break down pollutants in the environment is referred to as:
  - Nanoremediation
  - Microbial Bioremediation
  - Micro-remediation
  - All of these

11. Optimum temperature of thermophiles:
  - a. 80° C
  - b. 40-50° C
  - c. 65-75° C
  - d. 55-65° C
12. Which is of the following is a fermented product?
  - a. *Propionate*
  - b. *Purines*
  - c. *Acetate*
  - d. CO<sub>2</sub>
13. Which are NOT involved in trickling filter?
  - a. *Escherichia coli*
  - b. *Flavobacterium*
  - c. *Chlorella*
  - d. All of these
14. Which is causing Gastroenteritis?
  - a. *Escherichia coli*
  - b. *Rota virus*
  - c. *Microcystis aeruginosa*
  - d. All of these
15. Which of the following is an aerobic attached growth treatment process?
  - a. Roughing filter
  - b. Oxidation ditch
  - c. Sequencing batch reactor
  - d. Expanded-bed process
16. During bioremediation, which bacterial genus is most likely to produce surfactants?
  - a. *Pseudomonas*
  - b. *Achromobacter*
  - c. *Lactobacillus*
  - d. *Helomonas*
17. Which of the following could prevent phytoremediation from being effective?
  - a. It can take a long time to achieve complete remediation
  - b. It requires the use of harmful chemicals
  - c. It only works for certain types of contaminants
  - d. All of the above
18. Bioaugmentation entails:
  - a. Bioventing
  - b. Eliminating microbes
  - c. Bioremediation through the use of plants
  - d. Microorganism supplementation of a polluted area
19. The biostimulation mechanism is almost entirely dependent on:
  - a. Nutrients to stimulate the growth of the microbes in the environment
  - b. Environmental factors
  - c. Naturally occurring microbes
  - d. All of the above
20. Studies in metagenomics focus on:
  - a. Genomic sampling of a community of organisms sharing a habitat
  - b. Sequences of genes that are typical of several species
  - c. The use of genetics to a species that best represents the typical phenotypic of its genus
  - d. Sequencing of only the highly conserved genes in a lineage

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**( Descriptive )**

Time : 2 hr. 30 mins.

Marks : 50

[ Answer question no.1 & any four (4) from the rest ]

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|---------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|
| 1. Discuss details on Anaerobic suspended-growth treatment processes.                                                                                         | 10       |
| 2. Write short notes on:<br>a) Primary treatment<br>b) Aerobic pond                                                                                           | 5+5=10   |
| 3. What is waste water or sewage? Discuss details on composition, and types of sewage. Elaborate on measurement of water pollution.                           | 1+2+7=10 |
| 4. What is tertiary treatment? Give details on the solid removal process.                                                                                     | 2+8=10   |
| 5. What exactly is bioremediation? Distinguish between in-situ and ex-situ bioremediation. Provide a basic overview of petroleum hydrocarbon bio-remediation. | 2+3+5=10 |
| 6. What is the meaning of metagenomic? Describe the use of the metagenomic approach in environmental prospecting in detail.                                   | 2+8=10   |
| 7. Explain the concept of phytoremediation. Describe the numerous mechanisms of phyto-remediation. How various flora contribute to environmental cleanup?     | 1+6+3=10 |
| 8. What is a heavy metal contamination? Briefly describe the removal of heavy metals by plants and microorganisms.                                            | 2+8=10   |

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